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EXAMINER

PHAM, CHRYSTINE

ART UNIT	PAPER NUMBER
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2192

DATE MAILED: 08/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/989,180

Applicant(s)

DUESTERWALD ET AL.

Examiner

Chrystine Pham

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 May 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 and 13-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11 and 13-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This action is responsive to Amendment filed on May 13th 2005. Claims 1, 10, 14, and 17 have been amended. Claim 12 has been canceled. Claims 1-11, 13-18 are presented for examination.

Response to Arguments

2. Applicant's arguments filed May 13th 2005 have been fully considered but they are not persuasive.
3. The Applicants essentially contend that "the cited references do not disclose or suggest that at least one replacement function in a high level programming language is provided for each operation code being translated" (page 6, last paragraph). With respect to the currently amended claims 1, 10, and 17, it is submitted that D'Arcy teaches a method and system of translating/replacing operation codes (i.e., assembly code) into/with C language code (i.e., replacement code segments), as established in previous Office Action wherein said replacement code segments comprising at least one function for each operation code to be translated. For example, in col.6:10-25, D'Arcy specifically discloses that in C, all code (i.e., replacement code segments) must be part of a function. In steps 416, 422 FIG.4B, FIG.4C & associated text, D'Arcy clearly teaches generating replacement code segments for each assembly instruction (i.e., operation code) to be translated. In step 420 FIG.4B and FIG.4G, D'Arcy

clearly teaches generating at least one function for each operation code that is a export label. In steps 454-460 FIG.4D, D'Arcy clearly teaches generating replacement code segments for each operation code that is an import label. For every operation code in FIG.6A, D'Arcy clearly teaches generating "replacement code segments comprising at least one function for each operation code to be translated" (see at least *extern void l3()*, *file1_code()*, *case 1000*, *case 1001*, *case 1002*, *case 1003*, *case 1004*, *case 105*). As shown in FIG.6B, each of the replacement code segments generated for each of the operation code found in FIG.6A is part of a function (i.e., *file1_code()*, *extern void l3()*), it is clear that D'Arcy teaches replacement code segments comprising at least one function for each operation code to be translated.

4. With respect to Applicants' remark of FIG.6A and FIG.6B (pages 6-7), the Applicants had seemed to suggest that the claimed "at least one function" (of the replacement code) for an operation code cannot be the same function for another (i.e., different) operation code. However, it should be noted that this limitation, while may be intended by Applicants, is not clearly expressed in the currently amended claims.
5. In view of the fore going discussion, rejection of claims under 35 USC 102(e) and 103(a) is considered proper and maintained.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 1-5, 7, 9-13, and 15 are rejected under 35 U.S.C. 102(e) as being anticipated by D'arcy et al. (US 6467082), hereinafter, *D'arcy et al.*.

Claim 1

D'arcy et al. teach a method of producing a translator for computer executable instructions, the method comprising:

- programming replacement code segments (i.e., functions) in said translator (e.g., see 202 FIG.2A & associated text) in a high level programming language (e.g., see 'C' source code FIG.2A & associated text; see FIG.6B & associated text), wherein said translator is for translating computer executable program code from code for a first instruction set (e.g., see *first processor* col.3:35-46) to code for a second instruction set (e.g., see *second processor* col.3:35-46), said replacement code segments/functions for replacing portions of said code for a

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- first instruction set (e.g., see *code, optimized, host platform* col.3:35-col.4:2), said replacement code segments comprising at least one function for each operation code to be translated in said code for said first instruction set (see at least col.6:10-25; FIGS.3A,3B,4B-4D,4G,6A,6B & associated text); and
- o compiling said replacement code segments (i.e., functions) in said translator to create computer executable instructions (e.g., see 204 FIG.2A & associated text; see *compiled code, second processor* col.3:35-46).

Claim 2

The rejection of base claim 1 is incorporated. *D'arcy et al.* further teach wherein programming replacement code segments/functions in said translator in a high level programming language comprises programming hardware independent code segments/functions (e.g., see *C source code* FIG.2A & associated text; see FIG.6B & associated text; see *simulator, target processor, host machine, mXn* col.2:54-62; see FIG.2B & associated text; see "*mXn*" col.5:55-67).

Claim 3

The rejection of base claim 1 is incorporated. *D'arcy et al.* further teach wherein programming replacement code segments in said translator in a high level programming language comprises programming replacement functions in said translator (e.g., see '*C*', *code, function* col.6:10-17; see *extern void()*, *file1_code()* FIG.6B & associated text).

Claim 4

The rejection of base claim 1 is incorporated. *D'arcy et al.* further teach wherein said portions of said code for a first instruction set comprise operation codes (i.e., opcodes) (e.g., see FIG.3A & associated text; see FIG.6A & associated text).

Claim 5

The rejection of base claim 1 is incorporated. *D'arcy et al.* further teach wherein said translator comprises a dynamic translator (e.g., see *simulators, compilers, dynamic compilers* col.1:40-col.2:26; see 16 FIG.1 & associated text).

Claim 7

The rejection of base claim 1 is incorporated. *D'arcy et al.* further teach wherein programming said replacement code segments (i.e., functions) in said translator in said high level programming language comprises programming replacement code segments (i.e., functions) in the C programming language (e.g., see '*C*' source code FIG.2A & associated text; see FIG.6B & associated text).

Claim 9

The rejection of base claim 1 is incorporated. *D'arcy et al.* further teach wherein compiling said replacement code segments in said translator to create said computer executable instructions comprises processing said replacement code segments with a

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compiler designed to create computer executable instructions for said second instruction set (e.g., see 204 FIG.2A & associated text; see *target processor, native compiler, host machine* col.5:10-32; col.5:55-67).

Claim 10

D'arcy et al. teach a method of programming a translator, comprising:

- o writing at least one replacement functions in said translator (e.g., see 202 FIG.2A & associated text) in a high level programming language (e.g., see '*C*' language source code col.5:9-67; see FIG.6B & associated text) for each operation code to be translated (see at least col.6:10-25; FIGS.3A,3B,4B-4D,4G,6A,6B & associated text) to simulate (e.g., see *simulation system 200* FIG.2A & associated text) instructions in a computer program to be translated (e.g., see *assembly language program* col.5:9-67); and
- o compiling (e.g., see 204 FIG.2A & associated text) said translator to convert said replacement functions written in a high level programming language to low level computer executable instructions, so that said translator can replace said instructions in a computer program to be translated with said low level computer executable instructions for said replacement functions (e.g., see *compiled code, second processor* col.3:35-47; see *native compiler, host machine, run-time* col.5:9-67).

Claims 11, 12, 13, 15

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The rejection of base claim 10 is incorporated. Claims recite limitations, which have been addressed in claims 2, 4, 5, and 7, therefore, are rejected for the same reasons as cited in claims 2, 4, 5, and 7.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 8, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over *D'arcy et al.* in view of Tribble (Incompatibilities Between ISO C and ISO C++, <http://david.tribble.com/text/cdiffs.htm>), hereinafter, *Tribble*.

Claim 8

The rejection of base claim 1 is incorporated. *D'arcy et al.* do not expressly disclose wherein programming said replacement code segments in said translator in said high level programming language comprises programming replacement code segments in the C++ programming language.

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However, *Tribble* discloses a high level programming language being C++ programming language (e.g., see C++, or C++98 pages 1-40). It would have been obvious to one of ordinary skill in the pertinent art at the time the invention was made to substitute the C programming language disclosed by *D'arcy et al.* with C++ programming language as disclosed by *Tribble*. And the motivation for doing so would have been to facilitate local variable declarations within conditional expressions such as IF, WHILE, and SWITCH statements (e.g., *Tribble* page 5, section **Conditional expression declarations**), and support more complex types (template class and template functions) than C language (e.g., *Tribble* page 12, 4th to last line; page 31, section **Returning void**). Furthermore, C++ provides better support for object-oriented programming through language features such as data encapsulation, inheritance, runtime binding as well known in the art.

Claim 16

The rejection of base claim 10 is incorporated. Claim recites limitations, which have been addressed in claim 8, therefore, is rejected for the same reasons as cited in claim 8.

10. Claims 6, 14, 17, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over *D'arcy et al.* in view of Bugnion (US 6704925), hereinafter, *Bugnion*.

Claim 6

The rejection of base claim 1 is incorporated. *D'arcy et al.* do not expressly disclose wherein said translator comprises a caching dynamic translator in which one or more of said replacement code segments are stored in a cache during translation so that said replacement code segments can be executed repeatedly without repeatedly replacing said portions of said code for a first instruction set during a single translation process. However, *Bugnion* discloses a caching (e.g., see 230 FIG.2 & associated text) dynamic translator (e.g., see 200 FIG.2 & associated text; see *dynamic binary translator* Abstract) in which one or more of said replacement code segments (e.g., see *input instruction sequences*, *output instruction sequences* Abstract) are stored in a cache (e.g., see 230 FIG.2 & associated text; see *translation cache* Abstract) during translation so that said replacement code segments can be executed repeatedly without repeatedly replacing said portions of said code for a first instruction set during a single translation process (e.g., see Abstract). It would have been obvious to one of ordinary skill in the pertinent art at the time the invention was made to incorporate the teaching of *Bugnion* into that of *D'arcy et al.* for the inclusion of a caching dynamic translator. And the motivation for doing so would have been to eliminate the need for costly flushing the translation cache or retranslating (i.e., repeatedly replacing) the input instruction if only constants have changed since the original translation (e.g., *Bugnion* Abstract).

Claim 14

The rejection of base claim 10 is incorporated. Claim recites limitations, which have been addressed in claim 6, therefore, is rejected for the same reasons as cited in claim 6.

Claim 17

D'arcy et al. teach a method of producing a dynamic translator (e.g., see *simulators, compilers, dynamic compilers* col.1:40-col.2:26; see 16 FIG.1 & associated text) with portable run-time code synthesis (e.g., see 204 FIG.2A & associated text; see col.5:32-38), comprising:

- programming hardware independent replacement functions in a high level programming language for said dynamic translator (e.g., see *C source code* FIG.2A & associated text; see FIG.6B & associated text; see *simulator, target processor, host machine, mXn* col.2:54-62; see FIG.2B & associated text; see "*mXn*" col.5:55-67), wherein at least one replacement function is provided for each operation code to be translated (see at least col.6:10-25; FIGS.3A,3B,4B-4D,4G,6A,6B & associated text); and
- compiling said hardware independent replacement functions to produce hardware dependent computer executable replacement functions (e.g., see 204 FIG.2A & associated text; see *compiled code, second processor* col.3:35-46; see *native compiler, host machine* col.5:9-67). *D'arcy et al.* do not expressly disclose said dynamic translator being a caching dynamic translator. However, *Bugnion* disclose a caching (e.g., see 230

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FIG.2 & associated text) dynamic translator (e.g., see 200 FIG.2 & associated text; see *dynamic binary translator* Abstract). It would have been obvious to one of ordinary skill in the pertinent art at the time the invention was made to incorporate the teaching of *Bugnion* into that of *D'arcy et al.* for the inclusion of a caching dynamic translator. And the motivation for doing so would have been that, which has been cited in claim 6.

Claim 18

The rejection of base claim 17 is incorporated. Claim recites limitations, which have been addressed in claims 10, therefore, is rejected for the same reasons as cited in claim 10.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the

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shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chrystine Pham whose telephone number is 571-272-3702. The examiner can normally be reached on Mon-Fri, 8:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tuan Q. Dam can be reached on 571-272-3695. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

CP
August 2, 2005

A handwritten signature in cursive script, reading "Anthony Nguyen-Ba".

ANTHONY NGUYEN-BA
PRIMARY EXAMINER